In the claims:

Please amend the claims as follows:

What is claimed:

1 to 17 (withdrawn)

18. (currently amended) A method of treating a particulate material cryogenically to produce smaller particles, comprising the steps of:

cooling said material to cryogenic temperatures;

feeding said cooled material at a predetermined rate between at least one pair of closely spaced, counter-rotating rollers for reducing the size of said particles, one roller of said pair rotating at a first predetermined speed, and the second of said rollers rotating at a second higher predetermined speed; ~~and~~

thereafter subjecting said material to hammering for producing yet smaller particles;

adding a flow agent to said material and mixing said material and said flow agent together, said flow agent being selected to increase the recovery of the smallest particles of said material;

sorting said material through a plurality of screens to cut said material into fractions, each fraction including particulates of said material falling within a predetermined size range; and

collecting said fractions for packaging or storage.

19. (original) The method of claim 18 wherein said cooled material is fed between at least two pairs of said rollers.

20. (original) The method of claim 19 wherein said at least two pairs of rollers are arranged in vertical alignment with said first pair being disposed above said second pair.

21. (original) The method of claim 20 wherein cryogenic gas is added as said material passes through said pairs of rollers for additional cooling of said material during treatment between said pairs of rollers.

22. (original) The method of claim 21 wherein the speed differential between the rollers of each said pair thereof is in the range of 10:1.

23. (original) The method of claim 21 wherein the speed differential is 3 to 4:1 and is preferably 3.29:1.

24. (original) The method of claim 21 wherein cryogenic gas is added to said material during said hammering thereof.

25. (original) The method of claim 24 wherein said cooling of said material comprises the steps of first pre-cooling said material using cryogenic gas and then cooling said material by submersion in a cryogenic liquid.

26. (original) The method of claim 25 wherein said material is crumb rubber, said cryogenic gas is nitrogen gas and said cryogenic liquid is liquid nitrogen.

27. (currently amended) Apparatus for treating a particulate material cryogenically to produce smaller particles, comprising:

freezer means wherein said material is cooled to cryogenic temperatures;

at least a first pair of closely spaced apart, counter-rotating rollers sealed in a housing for receiving said cooled material therebetween for a first reduction in the size of said particles;

means for driving each roller of said pair at a selected, predetermined rotational speed; ~~and~~

means for receiving and storing said material following said cryogenic treatment thereof between said rollers;

means for adding a flow agent to said material and for mixing said material and said flow agent together, said flow agent being selected to increase the recovery of the smallest particles of said material;

sorting means for cutting said material into separate fractions, each fraction including particulates of said material falling within a predetermined size range; and

means for collecting said fractions for packaging or storage.

28. (original) The apparatus of claim 27 further comprising a second pair of closely spaced counter-rotating rollers sealed in a housing for receiving therebetween said material from said first pair of rollers for a second reduction in the size of said particles, and means for driving each roller of said second pair at a selected, predetermined rotational speed.

29. (original) The apparatus of claim 28 wherein said rollers are spaced apart by a small gap of adjustable width selected to cause a reduction in the size of said particles.

30. (original) The apparatus of claim 29 further comprising hammering means for receiving therein said material from either or both of said first and second pairs of rollers for a third reduction in the size of said particles.

31. (original) The apparatus of claim 30 wherein one roller of each of said first and second pair of rollers is driven by said drive means at a first predetermined rotational speed, and the second roller of each of said first and second pair is

driven by said drive means at a second higher predetermined speed.

32. (original) The apparatus of claim 31 wherein the speed differential between said rollers of each said pair thereof is in the range of 10:1 to 1.1:1.

33. (original) The apparatus of claim 31 wherein said speed differential is 3 or 4:1 and is preferably 3.29:1.

34. (original) The apparatus of claim 33 wherein said first pair of rollers is arranged above said second pair of rollers in parallel, vertical alignment therewith, the vertically aligned rollers to one side of said gap being connected by a drive member for rotation in one direction, and the vertically aligned rollers to the other side of said gap being connected by another drive member for rotation in the opposite direction, wherein said particles are drawn into, between and through said gap between each of said pairs of rollers, each said drive member being operationally connected to a prime mover for rotation of said rollers.

35. (original) The apparatus of claim 34 wherein said drive means are arranged so that the diagonally opposite rollers of each of said first and second pairs are driven at substantially the same rotational speed.

36. (original) The apparatus of claim 35 wherein said predetermined speed is approximately 700 rpm, and said second higher predetermined speed is approximately 2300 rpm.

37. (original) The apparatus of claim 36 wherein said gap between said rollers is adjustably maintained in the range from 0.001" to 0.01", and preferably in the range from 0.002" to 0.007".

38. (original) The apparatus of claim 37 wherein said gap is independently adjustable from either end of said rollers to be the same or variable in width along its length between said rollers.

39. (original) The apparatus of claim 38 wherein the surface of each roller is textured to facilitate treatment of said particulates.

40. (original) The apparatus of claim 39 wherein the surface of each roller includes spirally arranged longitudinally extending corrugations spaced apart at a predetermined pitch.

41. (original) The apparatus of claim 40 wherein said corrugations spiral at the rate of ½" per foot, the pitch of said corrugations being selectable in the range between 22 and 36.

42. (original) The apparatus of claim 41 wherein the profile of said corrugations is Allis Dull.

43. (original) The apparatus of claim 42 wherein said freezer means are partially filled with cryogenic liquid whereby some of said particulates are submerged below the level of said liquid for cooling and some are disposed above said liquid for pre-cooling by the vaporized gas from said cryogenic liquid.

44. (original) The apparatus of claim 43 wherein said cryogenic gas from said freezer means is discharged into said housings for said roller means for additional cooling of said particulates during treatment therein.

45. (original) The apparatus of claim 44 wherein cryogenic gas from said housings is discharged into said hammering means for additional cooling of said particulates during treatment therein.

46. (original) The apparatus of claim 45 wherein rotation of the rollers of either or both of said first and second pairs thereof at different rotational speeds promotes both grinding and shearing of the particles to reduce their size.

47. (original) The apparatus of claim 27 wherein said particulate material is crumb rubber.

48. (withdrawn)

49. (reinstated and currently amended) The method of claim ~~48~~ 18 wherein said flow agent is carbon black.

50. (reinstated) The method of claim 49 wherein said carbon black is Cabot Corporation carbon black product Nos. N990 or N234, or carbon black having characteristics similar thereto.

51. (reinstated) The method of claim 50 wherein said carbon black is added to said material in an amount from approximately 0.25% to about 2% by volume of said mixture.

52. (reinstated) The method of claim 51 wherein said material is crumb rubber and said carbon black increases the recovery of crumb rubber particles smaller than 100 mesh.

53. (new) The apparatus of claim 27 wherein said flow agent is carbon black.

54. (new) The apparatus of claim 53 wherein said carbon black is Cabot Corporation carbon black product Nos. N990 or N234, or carbon black having characteristics similar thereto.

55. (new) The apparatus of claim 54 wherein said carbon black is added to said material in an amount from approximately 0.25% to about 2% by volume of said mixture.

56. (new) The apparatus of claim 55 wherein said material is crumb rubber and said carbon black increases the recovery of crumb rubber particles smaller than 100 mesh.